

CityLab
Design

The Bright Future of the Pedestrian Bridge

Top engineer Ted Zoli says the era of shared-use structures has arrived.

By Eric Jaffe

January 30, 2015 at 11:35 AM EST



A decade ago, it was unusual to design a bridge with space for pedestrians or cyclists, says Ted Zoli, National Bridge Chief Engineer for the architecture and civil engineering firm HNTB. Today it's unusual not to give these modes space—or, in some cases, the entire structure. Even bridges that seem primarily suited for vehicle traffic must include what Zoli calls, in the parlance of engineers, "shared-use path facilities"; the new Tappan Zee Bridge will have one, he points out, as will a bridge HNTB is designing on I-95.

"Now every major project I'm working on has a shared-use path—a bicycle- or pedestrian-defined path—integrated into the design," says Zoli. "I would say the future of pedestrian bridges is significant in the practice of bridge design in urban areas."

When Zoli talks bridges, people listen. He earned a MacArthur genius grant back in 2009, and in a lengthy Esquire profile that followed, was named "the engineer of the moment." (The title doubles as an inside joke, as "moment" is a physics term describing force at a given point.) He's compared bridge design to poetry in the sense that both should try to do a whole lot with very little.

Zoli describes a pedestrian bridge as "fundamentally a different facility" than a vehicular one. Oddly enough, the distinction has little to do with the weight each must bear; that's generally the same in both cases, he says. Rather, the difference comes down to three design approaches: connectivity (how to get people up and down), aspiration (pedestrian bridges should be iconic, wayfinding landmarks unto themselves), and curvature (there's far less need for straightness).

"Non-straightness has value in terms of the overall performance of the facility, but also it's more characteristic of the way we walk and maybe to a lesser degree bicycle," he says. "So there's that experiential part that's different to me."

The experience of curvature drives the majesty of the Bob Kerrey Pedestrian Bridge, a 3,000-foot, S-shaped structure for walkers and cyclists that snakes between Omaha, Nebraska, and Council Bluffs, Iowa, over the Missouri River. The challenge here was finding a way to introduce curvature without blowing the budget out of the water (so to speak). Zoli met the task by using railing with no frills instead of a flashy finish, and engineering structural pieces that appear curved from afar but are actually straight at the individual level.

"The beauty of that was we didn't have to curve anything," he says. "We weren't making fancy geometry, neither in the railings nor in the structure itself."



"Non-straightness is more characteristic of the way we walk," says Ted Zoli, who designed the iconic S-shaped Bob Kerrey Pedestrian bridge. Courtesy of HNTB

Some of Zoli's other recent pedestrian designs include the Happy Hollow Park Bridge, in San Jose, which uses an innovative network tied-arch approach, and Squibb Park Bridge, in Brooklyn, a trail-style structure made with black locust wood to give the feeling of a "departure" from the city into nature. (Civil Engineering magazine described Squibb as "more muddy boots than designer heels.") Both designs encourage people to linger at meeting nodes in the middle, says Zoli.

They also share Zoli's zeal for cost-effectiveness. His interest in building strong bridges on leaner budgets was part of the reason he dedicated his MacArthur money toward developing high-quality rope bridges in remote areas. Synthetic rope not only costs less than steel cables, but it's easier to transport to back lands and to repair on site. He says a 210-foot pedestrian rope span in Morocco, where Zoli and a graduate student conducted an Engineers Without Borders project, cost a mere \$10,000.

Given the push toward walkability and balanced transport in urban areas, Zoli only expects the prevalence of pedestrian bridges to increase over time. Cities will see fewer car-only bridge projects—Zoli says most of the ones he does today are emergency repairs on aging structures—and more car-less designs. Get used to more designs that deliver multimodal connectivity like the Tilikum Crossing in Portland, OR below. (an HNTB project, though not Zoli's), a bridge that will ban passenger cars.

"Pedestrian and bicycles and mass transit inhabiting similar corridors—that's just good urban planning and sensibility," he says. "To have that occur on a bridge is notional about our future. Right?"



The Squibb Park Bridge in Brooklyn (top) and the Happy Hollow Park Bridge in San Jose both cater to pedestrians. top: HNTB; bottom: Andy Ryan, Courtesy of HNTB



The Tilikum Crossing in Portland, rendered above, will be a multimodal bridge that bans cars. *HNTB*